

A REVIEW OF THE FAMILIES OPHIDIIDAE AND BYTHITIDAE FROM TAIWAN¹

LIH-JEN CHEN and KWANG-TSAO SHAO²

Institute of Zoology, Academia Sinica,
Nankang, Taipei, Taiwan 11529,
Republic of China

(Accepted June 1, 1990)

Lih-Jen Chen and Kwang-Tsao Shao (1991) A review of the families Ophidiidae and Bythitidae from Taiwan. *Bull. Inst. Zool. Academia Sinica* 30(1): 9-18. According to the early literature, the fishes of Ophidiidae in Taiwan contained 9 genera and 15 species in which 2 genera and 2 species should be assigned to Bythitidae. But the results of the present study reveal that many specimens belonging to the above taxa were misidentified or lost. Thus, only 5 genera and 7 species of Ophidiidae are definitely recognized thus far. They are *Brotula multibarbata*, *Ophidion asiro*, *Hoplobrotula armata*, *Sirembo imberbis*, *Neobythites sivicola*, *N. nigromaculatus* and *N. stigmosus*. The rest of the six species were either misidentified or lost specimens. The family Bythitidae was named for the first time in Taiwan, containing only 2 genera and 3 species. They are *Brotulina fusca*, *Dinematichthys minyomma* and *D. pasyrhynchus*. The latter two species are new records in Taiwan and both of them were previously identified as *D. ilucoeteoides*. Keys, diagnostic characteristics and color photographs of the above species are provided in this paper.

Key words: Fish fauna, Ophidiidae, Bythitidae, Fish taxonomy, Taiwan.

Fishes of the families Ophidiidae and Bythitidae, commonly called cusk-eels and viviparous brotulas, were formerly combined into a single family, Ophidiidae. Early ichthyologists divided the Ophidiidae into two families, Ophidiidae and Brotulidae according to the developmental state of the pseudobranch. In 1978, Cohen and Nielsen revised the whole order of Ophidiiformes and the phyletic relationships and taxonomic rank among various genera, families and suborders of ophidiids were established. We have followed the system suggested by Cohen and Nielsen (1978) to limit the classification of Ophidiiformes into two suborders

and four families. The fishes of suborder Ophidioidei are oviparous, lacking an external intromittent organ in the male, with the anterior nostril well above the upper lip in most species of Carapidae and Ophidiidae. Another suborder, Bythitoidei including Bythitidae and Aphyonidae, is viviparous fishes, having an external intromittent organ in the male, with the anterior nostril immediately above the upper lip in most species. Four subfamilies, namely: Brotulinae, Brotulotaeninae, Ophidiinae and Neobythitinae are included in the family Ophidiidae.

In Taiwan, Aphyonidae is the only family among Ophidiiformes which has yet to be found. Since the pearlfishes,

1. Paper No. 344 of the Journal Series of the Institute of Zoology, Academia Sinica.

2. To whom reprint request should be sent.

Carapidae, have been recently revised by Shen and Yeh (1987), the present paper only covers the families Ophidiidae and Bythitidae. The name of the family Bythitidae did not appear in the previous literature or fauna list of Taiwan since it was included in the family Ophidiidae.

The earliest record of ophidiids from Taiwan was *Brotula formosae* (Jordan and Evermann, 1902) which is now synonymized under *B. multibarbata*. In 1956, Chen added *Watasea sivicola* (=now *Neobythites sivicola*) and *Sirembo imberbis*. In 1966, Chen listed further species, namely, *Itatius microlepis*, *Neobythites nigromaculatus*, *N. fasciatus* and *Monomitopus kumai*. In the latest revision of Taiwan vertebrates by Chen and Yu (1986), the following 4 species were increased: *Bassobythites brunswigi*, *Dinematichthys ilucoeteoides*, *Homostolus acer* and *Hoplobrotula armata*. In the most recent records, Shen added *Neobythites stigmosus* in 1986 and *Monomitopus pallidus* in 1988. With these the total recorded Taiwan ophidiid species in the literature is 14. However, one of them, *Dinematichthys ilucoeteoides*, should be excluded from the current list since it has been transferred to the family Bythitidae. A total of 7 genera and 13 species of real ophidiids have been confirmed from the previous literature in Taiwan. However, after several years of intensive collection and re-examination of all specimens deposited in Taiwan, we found that many specimens had been misidentified or lost. Until now, only 5 genera and 7 species have truly been identified in Taiwan. They are *Brotula multibarbata*, *Opidion asiro*, *Hoplobrotula armata*, *Sirembo imberbis*, *Neobythites sivicola*, *N. nigromaculatus* and *N. stigmosus*. The remaining six species should be excluded temporarily because of the specimens of *H. acer* and *B. brunswigi* have not been found, while specimens labelled *M. kumai*, *M. pallidus*, *N. fasciatus* and *Pyrrocraepedum* (= *Itatius*) *microlepis* in museums in Tai-

wan were all misidentified.

In the family Bythitidae, *Brotulina fusca* (Kamohara, 1957) was mistakenly included as the earliest record in Taiwan by Chen (1969). In fact, it was collected from Amami-Oshima of Japan. The specimen actually collected from Taiwan is reported in the present paper for the first time. The *D. ilucoeteoides* collected by Chang *et al.* (1978) from a coral reef area around Taiwan should be assigned to *D. minyomma* or *D. dasyrhynchus* according to Cohen and Hutchins (1982), and Sedor and Cohen (1987). In addition the typical *D. ilucoeteoides* has not yet been found, thus a total of three species: *B. fusca*, *D. minyomma* and *D. dasyrhynchus*, are now confirmed to occur in Taiwan; the latter two species are new records. The above two genera belong to the subfamily Brosmophycinae and should be included in the tribe Dinematichthyini according to Cohen and Nielsen (1978).

MATERIALS AND METHODS

All specimens of ophidiids except for *Brotula multibarbata* were collected by trawl net from waters deeper than 150 meters. The latter species, together with all species of bythitids, were collected by scuba diving around a coral reef area. The specimens were photographed when fresh and then preserved in 10% formalin for further observation. Specimens collected by the authors in recent years were first cataloged as LFAS when deposited temporarily in the laboratory; and then transferred to ASIZP when deposited in the Institute. Other specimens were borrowed from other institutions; the National Taiwan University (NTUM), National Sun Yat-Sen University (NSYSU), and the Taiwan Fishery Research Institute Tunkang Branch (TFRIT). The catalogue numbers of the latter two institutions were not available. Because

the fin rays were covered with thick skin, all specimens were X-rayed for meristic counts. The counting method and the morphometric measurements mostly follow Cohen (1964); whereas those for developed gill rakers and median basi-branchial tooth patches follow Cohen and Nielsen (1978); and the counts of lateral scale rows (LR) follow Cohen (1987).

SPECIES ACCOUNTS

Key to families Ophidiidae and Bythitidae

1. Oviparous, males lacking a developed external intromittent organ. Anterior nostril well above upper lip in most species. Dorsal and anal fins joined with caudal fin.....Ophidiidae
- Viviparous, males with various developed external intromittent organs. Anterior nostril close to upper lip in most species. Dorsal and anal fins connected with caudal fin or separateBythitidae

Ophidiidae

Key to subfamilies (in parenthesis), and species of Ophidiidae

1. Barbels present on snout or chin (Brotulinae)..... *Brotula multibarbata*
- No barbels on snout or chin.....2
2. Ventral fins forward anteriorly below eyes; filament of bone extends anteriorly from junction of ventral arms of cleithra (Ophidinae).....
..... *Ophidion asiro*
- Ventral fins farther back, behind eyes; no filament of bone extending anteriorly from junction of ventral arms of cleithra (Neobythitinae)...3
3. Ventral fins extending below the rear margin of the orbital.....4
- Ventral fins extending below the rear margin of the preopercle.....5
4. The lower angle of preopercle with three strong emergent spines.....

-*Hoplobrotula armata*
- Lower angle of preopercle entire.....
.....*Sirembo imberbis*
5. Dorsal fin with large black blotches...6
- Dorsal fin without large black blotches
.....*Neobythites sivicola*
6. Dorsal fin with a large white-rimmed blackish ocellus; anal fin without blotches..... *N. nigromaculatus*
- Dorsal fin with 10 to 11 black blotches and anal fin has 4 to 5...*N. stigmatosus*

Brotula multibarbata Temminck and Schlegel, 1846

(Fig. 1)

Brotula multibarbata Temminck and Schlegel, 1846:
251 (Type locality: Simabara Bay, Japan);
Hubbs, 1944: 170.

Brotula formosae Jordan and Everman, 1902: 364-365.

Materials: ASIZP 054720, 239.5 mm SL., March 25, 1975, Maopitou; LFAS 946, 262 mm SL., May 20, 1986, Hsiaoliuchiu; LFAS 1973, 195.0 mm SL., April 30, 1980, Houpihu.

Diagnosis: D. 128; A. 105; P. 19-20; V. 2; C. 10. Developed GR. 3. Vertebrate 59. Head 4.92-5.13, body depth 5.40-4.43, preanal 2.35-2.43, predorsal 4.36-4.46 in standard length. Eye diameter 4.53-5.11, pectoral 2.20-2.30, ventral 1.53-1.76 in head length. Interorbit 1.25-1.39, snout 0.96-1.2 in eye diameter.

Head and body covered with scales. Operculum with a spine embedded in the skin. Preopercular spine absent. Six barbels on snout and chin. Pectoral fins short and round. Ventral fins jugular, each with 2 joined rays. Median basi-branchial tooth patch absent. Body color in fresh generally brown, except for the pale ventral and pelvic fins. Margins of dorsal, anal and caudal fins blackish.

Distribution: Southern Japan and the tropical Indo-Western Pacific (Machida in Masuda *et al.*, 1984). It commonly occurs along the south-western coast of Taiwan.

***Ophidion asiro* (Jordan and Fowler, 1902)**

(Fig. 2)

Otophidium asiro Jordan and Fowler, 1902: 752
(Type locality: Misaki, Sagami).

Ophidion asiro Machida in Masuda *et al.*, 1984: 99.

Materials: ASIZP 00023, 178.5 mm SL., Aug. 20, 1965, Tainan; NTUM 06437, 88.2 mm SL., Nov. 2, 1977, Kaohsiung.

Diagnosis: D. 146; A. 112; P. 23; V. 2; C. 9. Developed GR. 4; Vertebrate 64-65. Head 4.69-5.41, body depth 7.47-8.91, preanal 2.25-2.56, predorsal 3.60-3.77 in standard length. Eye diameter 3.20-3.37, pectoral 2.06-2.10, ventral 1.59-1.68 in head length. Interorbital space 1.76-1.92, snout 1.34-1.55 in eye diameter.

Body very slender. Scales absent from head. Body scales elongated and at oblique angles to each other. Opercle and preopercle entire. Ventral fins, each jugular with 2 separate rays. Pectoral and caudal fins rounded. Median basibranchial tooth patch absent. Body color in fresh generally light brown with fine pale yellowish spots. The coloration soon fades after preservation. Dorsal and anal fins transparent with blackish-brown outer margins.

Distribution: Distributed in tropical and warm temperate waters around the world mostly on the continental shelf including reefs (Cohen and Nielsen, 1978). In Taiwan, it occurs only along the south-western coast, but very rarely.

***Hoplobrotula armata* (Temminck and Schlegel, 1842)**

(Fig. 3)

Brotula armata Temminck and Schlegel, 1842: 255.
(Type locality: Nagasaki).

Hoplobrotula armata Jordan and Fowler, 1902: 760.

Materials: NTUM 06135, 2 specimens, 185-166 mm SL., Nov., 1982, Kaohsiung; NTUM 06459, 292 mm SL., March 11, 1975,

Tungkang; NSYSU, 141.5-173.5 mm SL., 1987.

Diagnosis: D. 88; A. 74-75; P. 19-20; V. 2; C. 9. Developed GR. 5. Vertebrate 54. Head 4.21-4.55, body depth 5.74-6.19, preanal 2.35-2.70, predorsal 3.31-3.79 in standard length. Eye diameter 4.51-4.95, pectoral 1.16-1.41, ventral 1.60-2.02 in head length. Interorbital space 0.84-0.91, snout 0.91-1.38 in eye diameter.

Except for the top of head, the entire body covered with scales. One spine on tip of snout which is embedded in the skin. One sharp, strong spine on opercle, and three strong spines at the lower angle of preopercle. Pectoral fin rays long. Basibranchial with a median and 1 pair of tooth patches. Maxilla quite large. Its width near the end is almost equal to eye diameter. Lateral line straight. Color in fresh: dorsal fin, posterior half of anal fin and upper part of body are blackish.

Distribution: Distributed from southern Japan to the East China Sea. In Taiwan, it occurs rarely with its distribution confined to along the south-western coast.

Remarks: The three specimens deposited at NTUM were previously misidentified as *Sirembo imberbis*. They are distinguishable from the latter by having only one ventral fin ray.

***Sirembo imberbis* (Temminck and Schlegel, 1846)**

(Fig. 4)

Brotula imberbis Temminck and Schlegel, 1842: 253
(Type locality: Nagasaki).

Sirembo imberbis Jordan and Fowler, 1902: 757;
Cohen and Robins 1986: 257.

Materials: LFAS 1909, 151 mm SL., Sept. 28, 1985, Penghu; TFRIT, 2 specimens, 130-131.8 mm SL., Tungkang.

Diagnosis: D. 89-92; A. 65-68; P. 22-23; V. 1; C. 9. Developed GR. 4. Vertebrate 50-51. Head 4.5-4.72, body depth

5.46-6.11, preanal 2.23-2.31, predorsal 4.21-4.73 in standard length. Eye diameter 3.90-4.42, pectoral 1.52-1.73, ventral 1.46-1.55 in head length. Interorbital space 0.92-1.01, snout 0.97-1.11 in eye diameter.

Head and body fully covered with scales. Operculum with a strong spine, but preoperculum without spine. Ventral fins with a single ray in each inserted beneath rear margin of the eye. A single median basibranchial tooth patch. Color in fresh: the upper part of body with many irregular, discontinuous brown spots. Head with a brown band from tip of snout through eye to opercular spine. Dorsal fin with many brown spots. Anal fin blackish, with white margin.

Distribution: Distributed from the Red Sea to Japan, the Philippines and Australia (Cohen and Nielsen, 1978). In Taiwan, it occurs occasionally along the south-western coast and around the Peng-hu Islands.

Remarks: The specimens deposited at TFRIT were previously misidentified as *N. fasciatus*.

***Neobythites sivicola* (Jordan
and Snyder, 1901)**

(Fig. 5)

Watasea sivicola Jordan and Snyder, 1901: 765 (Type locality: Misaki, off Yokohama); Jordan and Fowler, 1902: 759.

Neobythites sivicola Cohen and Nielsen, 1978: 36; Machida, 1984: 255.

Sirembo imberbis (nec. Temminck and Schlegel, 1846),

Materials: ASIZP 056363, 3 specimens, 131-184.5 mm SL., May 22, 1988, Tahsi; LFAS 1753, 8 specimens, 131-175 mm SL., Nov. 7, 1988, Tahsi; NTUM 06468, 155 mm SL., Dec. 28, 1977, Nanfunao; NTUM 06133, 157 mm SL., Oct. 26, 1981, Tahsi; NTUM 06082, 186.5 mm SL., March 27, 1985, Tahsi; NTUM 06157, 2 specimens, 78-101 mm SL., June 5, 1985, Tahsi; NTUM 06269, 3 specimens, 70-164 mm SL., April 22, 1978, Tahsi;

NTUM 06131, 2 specimens, 129-168 mm SL., Feb. 24, 1975, Tahsi; NTUM 06132, 165 mm SL., Sept. 17, 1981; Tahsi.

Diagnosis: D. 93-96; A. 75-79; P. 21-25; V. 2; C. 8. Developed GR. 10-11. Vertebrate 53-56. Head 4.56-9.02, body depth 4.92-6.81, preanal 2.36-2.64, predorsal 3.82-4.35 in standard length. Eye diameter 4.08-4.77, pectoral 1.47-1.90, ventral 1.27-1.84 in head length. Interorbital space 0.80-1.15, snout 0.96-1.06 in eye diameter.

Head and body fully covered with scales. Operculum with a sharp, strong spine. Preoperculum with two small spines at the lower angle. Ventral fins jugular. Head, body and fins scattered with fine brownish spots. Median basibranchial tooth patches 2. Lateral line rises slightly behind opercle and runs straight below the dorsal insertion. Color in fresh: except for the pale ventral fins and transparent pectoral fins, upper part of body, dorsal, caudal and posterior half of anal fins are light brown, with many white spots of variable sizes.

Distribution: Distributed from Misaki to Tosa Bay, and Toyama in Japan (Machida in Masuda *et al.*, 1984). This species commonly occurs year-round at Tahsi.

Remarks: The specimens cataloged as NTUM 06082 and NTUM 06147 and labelled *N. sivicola* at NTUM were misidentified as *Monomitopus pallidus*. The latter species can be easily distinguished from the former one by having more developed gill rakers. *e.g.* 17 vs 10-11.

***Neobythites nigromaculata*
Kamohara, 1938**

(Fig. 6)

Neobythites nigromaculata Kamohara, 1938: 67 (Type locality: Mimase); Kamohara, 1952: 92.

Materials: NTUM 06134, 165 mm SL., Feb. 4, 1972, Tungkan; NTUM 06988, 129 mm SL., Nov. 23, 1985, Tungkan.

Diagnosis: D. 89-90; A. 72-75; P. 23-24; V. 2; C. 8. Developed GR. 10; Vertebrate 52. Head 4.36-4.56, body depth 5.61-6.19, preanal 2.39-2.46, predorsal 3.92-4.31 in standard length. Eye diameter 4.34-4.48, pectoral 1.36-1.68, ventral 1.29-1.33 in head length. Interorbital space 1.02, snout 0.96-1.05 in eye diameter.

Head and body covered with scales. Operculum with a sharp, strong spine, preoperculum with two spinules at the lower angle. Ventral fins jugular. Median basibranchial tooth patches 2. Lateral line is raised a little behind opercle being straight from the origin of dorsal fin. Color in fresh similar to that of *N. sivicola*, except for the presence of a large black, white-rimmed ocellus at anterior 1/3 of dorsal fin.

Distribution: Distributed in Japan with a range from Wakayama Pref. to Tosa Bay, (Machida in Masuda *et al.*, 1984). In Taiwan, it rarely occurs with the distribution confined to the south-western coast.

***Neobythites stigmosus* Machida, 1984**

(Fig. 7)

Neobythites stigmosus Machida, 1984: 250 (Type locality: Okinawa); Shen *et al.*, 1986: 65.

Materials: LFAS 1656, 3 specimens, 94.3-151 mm SL., May 2, 1988, Tahsi; LFAS 1768, 138.3 mm SL., Nov. 4, 1989, Tungkang; NTUM 06130, 2 specimens, 121-128 mm SL., Oct. 1, 1980, Tahsi; NTUM 06269-2, 124 mm SL., April 22, 1978; Tahsi; NTUM 06181, 103 mm SL., Feb. 17, 1985, Tungkang.

Diagnosis: D. 102-106 (mode 102); A. 86-87; P. 22-25; V. 2; C. 8. Developed GR. 10-12. Vertebrate 58-60. Head 4.76-5.16, body depth 6.27-7.05, preanal 2.39-2.83, predorsal 3.82-4.45 in standard length. Eye diameter 3.91-4.19, pectoral 1.51-1.96, ventral 1.63-1.96 in head length. Interorbited space 0.91-1.25, snout 1.00-1.50 (mode 1.10) in eye diameter.

Head and body covered with scales. Operculum with a sharp strong spine, preoperculum with two spinules at the lower angle. Ventral fins jugular. Median basibranchial tooth patches 2. Color in fresh: generally greyish with irregular black bands on upper part of body, and two longitudinal dark bands on head. Dorsal fin has a series of 5 widely spaced black blotches, with semicircular black blotches on distal margins of inter spaces. Color patterns on anal fin are similar to those on dorsal fin.

Distribution: Distributed from Japan to the East China Sea. In Taiwan, it commonly occurs on the western coast.

Remarks: The *N. stigmosus* was mistaken for *N. fasciatus* by Smith and Radcliffe. *N. stigmosus* can be distinguished from the latter by the presence of cross bands on body side and median fins, deeper body (SL/BD, 6.6-7.5 vs 5.6-6.2), and a slightly shorter head (SL/HL, 4.9-5.3 vs 4.6-4.7) (Machida, 1984). *N. stigmosus* has also been misidentified as *Monomitopus kumai*. However, it is easily distinguished from the latter in having less developed gill rakers (10-12 vs 17) and the presence of dark spots on median fins.

Bythitidae

Key to species of Bythitidae

1. Anterior nostril rather high, located about midway between upper lip and posterior nostril.....2
- Anterior nostril low, close to upper lip *Brotulina fusca*
2. Lateral scale rows about 140
.....*Dinematichtys dasyrhynchus*
- Lateral scale rows 79-89...*D. minyomma*

***Brotulina fusca* Fowler, 1946**

(Fig. 8)

Brotulina fusca Fowler, 1946 (Type locality: Ryukyu Island); Machida in Masuda *et al.*, 1984: 101.

Materials: LFAS 1927, male, 50 mm SL., March 26, 1975. Maopitou; LFAS 1273, female, Feb. 5, 1986, Hsiaowan.

Diagnosis: D. 74; A. 56; V. 1; P. 19; C. 14. Developed GR. 3. Vertebrate 12+31. Head 4.01; body depth 7.08, preanal 2.07, predorsal 3.24 in standard length. Eye diameter 10.6, pectoral 1.77, ventral 1.13 in head length. Interorbital space 0.48, snout 0.37 in eye diameter.

Caudal fin free from dorsal and anal fins. Anterior nostril low, close to upper lip. Opercle with a strong spine. Maxilla rounded and expanded posteriorly. Intromittent organ of male with 2 pairs of pseudoclaspers. Body generally light-brown.

Distribution: Distributed through out Indo-Pacific reefs (Cohen and Nielsen, 1984). It is occasionally found around the coral reefs of southern Taiwan.

***Dinematichthys dasyrhynchus* Cohen and Hutchins, 1982**

(Fig. 9)

Dinematichthys dasyrhynchus Cohen and Hutchins, 1982: 341-347. (Type locality: Rottneest Island)

Dinematichthys iluocoeleoides (nec. Bleeker, 1855), Chen, 1985: 340.

Materials: NTUM 06268, male, 136 mm SL., July 27, 1982. Lanyu; LFAS 1926, male, 102 mm SL., Sept. 10, 1985, Wanlitung.

Diagnosis: D. 88-90; A. 68-69; V. 1; P. 24; C. 17; LR. 130. Developed GR. 3. Vertebrate 12+32. Head 3.65-3.80; body depth 4.17-4.64, preanal 1.98-2.19, predorsal 3.20 in standard length. Eye diameter 11.13-11.67, pectoral 1.79-1.94, ventral 1.18-1.21 in head length. Interorbital space 0.31-0.34, snout 0.39-0.41 in eye diameter.

Caudal fin free from dorsal and anal fins. Anterior nostril rather high, located at about midway between upper lip and posterior nostril. Opercle with a sharp spine, sometimes embedded in the skin. Maxilla expanded posteriorly with the

rear margin rounded. Body fully covered with cycloid scales. Back of head naked except for the scaled cheek. Snout and lower jaw with many dark brown cirri.

Distribution: Distributed in Rottneest Island. In Taiwan, it rarely occurs with the distribution confined around the coral reefs of southern Taiwan.

Remarks: This species was previously identified as *D. iluocoeleoides* in Taiwan. But according to Cohen and Hutchins (1982), *Dinematichthys dasyrhynchus* is different from *D. iluocoeleoides* by having more dorsal fin rays (96-103 vs 83), higher LR counts (140 vs 100), smaller eyes (HL/ED, 6.9-9.4 vs. 5.3), and the posterior end of maxilla unsheathed.

***Dinematichthys minyomma* Sedor and Cohen, 1987**

(Fig. 10)

Dinematichthys minyomma Sedor and Cohen, 1987: 5-10. (Type locality: Bay Island)

Dinematichthys iluocoeleoides (nec. Bleeker, 1855), Chen, 1985: 340.

Materials: ASIZP 054767, 6 specimens, 8.2-34 mm SL., March 26, 1975, Maopitou; LFAS 1928, female, 51.6 mm SL., March 24, 1988, Wanlitung. LFAS 1781, male, 77.9 mm SL., May 8, 1989, Yehliu.

Diagnosis: D. 75-79; A. 63-64; V. 1; P. 19-22; C. 16; LR. 80-95. Developed GR. 0-3. Vertebrate 12+31. Head 3.5-3.8, body depth (origin of anal fin) 4.6-5.2, preanal 2.0-2.3, predorsal 2.8-3.5 in standard length. Eye diameter 9.2-15, pectoral 1.7-1.8, ventral 1.2-1.5 in head length. Interorbital space 0.2-0.5, snout 0.3-0.5 in eye diameter.

Distribution: Distributed in the Caribbean Sea. In Taiwan, it commonly occurs around the coral reefs of southern Taiwan.

Remarks: Like the above species, this species was previously included in *D. iluocoeleoides*. Specimens of typical *D. iluocoeleoides* have not yet been collected



Fig. 1. *Brotula multibarbata* 195.0 mm SL.

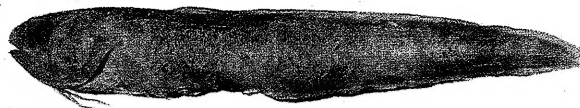


Fig. 2. *Ophidion asiro* 178.5 mm SL.

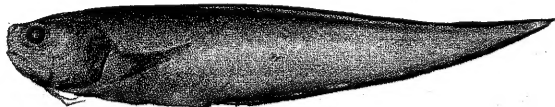


Fig. 3. *Hoplobrotula armata* 185.0 mm SL.

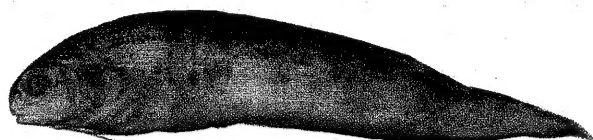


Fig. 4. *Sirembo imberbis* 151.0 mm SL.

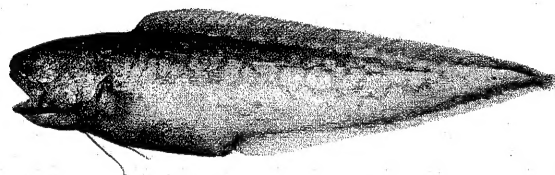


Fig. 5. *Neobythites sivicola* 175.0 mm SL.

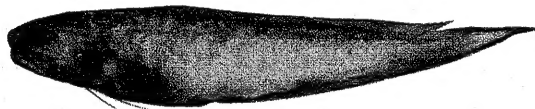


Fig. 6. *Neobythites nigromaculatus* 171.5 mm SL.



Fig. 7. *Neobythites stigmosus* 138.3 mm SL.



Fig. 8. *Brotulina fusca* 42.5 mm SL.

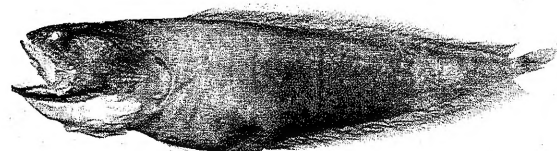


Fig. 9. *Dinematichthys dasyrhynchus* 93.0 mm SL.



Fig. 10. *Dinematichthys minyomma* 46.1 mm SL.

in Taiwan. The diagnostic characteristics of *D. iluocoeteoides* have been designated as the number of lateral line scales, about 100, and the size of the eye diameter, 5.3 in head length. *Dinematichthys minyomma* resembles *D. dasyrhynchus*, but is distinguishable by having fewer LR (79-89 vs 140), dorsal rays (73-80 vs 96-103) and anal rays (55-62 vs 62-69), according to Sedor and Cohen (1987).

Acknowledgements: These studies were financially supported by the National Science Council (NSC 77-0211-B001-26). The authors wish to thank Dr. S. C. Shen, of National Taiwan University (NTU), Professor M. J. Yu, of Tunghai University (TU), and Dr. S. C. Lee, of this Institute for their assistance and the loans of the references. We also appreciate the specimen loans by the following Institutions: Museum of Department of Zoology, NTUM; Department of Biology, TU; Institute of Marine Biology, National Sun Yat-Sen University; TFRI at Tungkuang, Keelung and Kaoshiung. We also would like to thank Drs. S. C. Lee and S. C. Shen for correcting the manuscript and to our colleagues in the laboratory for their help in collecting and photographing the fish specimens.

REFERENCES

- Chang, K. H., S. C. Lee and K. T. Shao (1978) A list of forty newly recorded coral fishes in Taiwan. *Bull. Inst. Zool., Academia Sinica* 17(1): 75-78.
- Chen, J. T. F. (1969) *A synopsis of the Vertebrates of Taiwan*. 1: 193-200.
- Chen, J. T. F. and M. J. Yu (1985) *A Synopsis of the Vertebrates of Taiwan*. 1: 337-341.
- Chung, S. (1984) Note on a rare fish specimen display at the Fishery Association in Kaohsiung. *Fish. Newslett. Kaohsiung* 4(9): 31-32.
- Cohen, D. M. and J. G. Nielsen (1978) Guide to the identification of genera of the fish order Ophidiiformes with an order tentation. *NOAA Tech. Rep. NMFS Circul.* 417: 1-42.
- Cohen, D. M. and J. B. Hutchins (1982) Description of a new *Dinematichthys* (Ophidiiformes: Bythitidae) from Rottneest Island, Western Australia. *Rec. West. Aust. Mus.* 9(4): 341-347.
- Cohen, D. M. and C. R. Robins (1986) A review of the ophidiid fish genus *Sirembo* with a new species from Australia. *Mem. Qd. Mus.* 22: 253-263.
- Fowler, H. W. (1946) A collection of fishes obtained in the Riu Kiu Islands by Captain Ernest R. Tinkham. *Aus. Proc. Nat. Sci. Philad.* 98: 123-218, 76 figs.
- Fraser, T. H. (1972) Some thoughts about the teleostean fish concept—the Paracanthopterygii. *Jap. J. Ichthyol.* 19: 232-242.
- Gosline, W. A. (1953) Hawaiian shallow-water fishes of the family Brotulidae, with the description of a new genus and notes on brotulida anatomy. *Copeia* 4: 215-225.
- Gosline, W. A. (1968) The suborders of perciform fishes. *Proc. U.S. Natl. Mus.* 124: 1-78.
- Hubbs, C. L. (1944) Species of the circumtropical fish genus *Brotula*. *Copeia* 3: 162-178.
- Jordan, D. S., and B. W. Evermann (1902) Notes on a collection of fishes from the Islands of Formosa. *Proc. U.S. Natl. Mus.* 24(1289): 315-368.
- Jordan, D. S. and J. O. Snyder (1901) List of fishes collected in 1885 by Pierre Louis Jouy and preserved in the United States National Museum, with descriptions of six new species. *Proc. U.S. Natl. Mus.* 23: 735-769.
- Jordan, D. S. and H. W. Fowler (1902) A review of the ophidioid fishes of Japan. *U.S. Natl. Mus.* 25: 743-766.
- Kamohara, T. (1938) On the offshore bottom-fishes of Pref. Tosa, Shikoku, Japan. 86 pp. 43 figs.
- Kamohara, T. (1952) Revised descriptions of the offshore bottom-fishes of Pref. Tosa, Shikoku, Japan. 122 pp.
- Kamohara, T. (1957) List of fishes from Amami-Oshima and adjacent regions, Kagoshima Prefecture, Japan. *Rep. Usa. Mar. Biol. St.* 4(1): 1-65.
- Machida, Y. (1984) Order Ophidiiformes. In: *The fishes of Japanese Archipelago*. (eds.). Tokai Univ. Press, Tokyo. pp. 99-101.
- Marshall, N. B. and D. M. Cohen (1973) Order Anacanthini (Gadiformes). Characteristics and synopsis of families. *Mem. Sears Found. Mar. Res.* 1(6): 479-495.

- Masuda, H., K. Amaoka, C. Araga, M.T. Uyeno and T. Yoshino (1984) *The Fishes of the Japanese Archipelago*. Tokai Univ. Press, Tokyo. 437 pp.
- Mead, G.W., E. Bertelsen and D.M. Cohen (1964) Reproduction among deep-sea fishes. *Deep-Sea Res.* **11**: 569-596.
- Radcliff, L. (1913) Description of seven new genera and 31 new species of fishes of the families Broulidae and Carapidae from the Philippine Islands and the Dutch East Indies. *Proc. U.S. Natl. Mus.* **44**: 135-176.
- Sedor, A.N. and D.M. Cohen (1987) New bythitid fish, *Dinemathichthys minyomma*, from the Caribbean Sea. *Contrib. in Sci.* **385**: 5-10.
- Shen, S.C. (1984) *Coastal Fishes of Taiwan*. Taiwan Museum. 533 pp.
- Shen, S.C., L.C. Yu and H.S. Yeh (1986) Additions to the fish-fauna from the adjacent waters around Taiwan (I). *J. Taiwan Mus.* **39**(1): 65-74.
- Shen, S.C. and H.S. Yeh (1987) Study on pearl-fishes (Ophidiiformes: Carapidae) of Taiwan. *J. Taiwan Mus.* **40**(2): 45-56.
- Shen, S.C. (1988) Catalog of the fish specimens deposited in the museum of the Department of Zoology, National Taiwan University. *Acta Zool. Taiwan* **2**: 1-162.
- Smith, M.M. and P.C. Heemstra (1984) *Smith's Sea Fishes*. Macruillan, South Africa. pp. 354-356.
- Temminck, C.J. and H. Schlegel (1842-50) Pisces: 324 pp., 144 pls. In: Ph. Fr. von Siebold, Fauna Japonica. (Part I, 1842: 1-20; Part II-IV, 1843: 21-72; Part V-VI, 1844: 73-112; Part VII-IX, 1845: 113-172, pl. I-CXLIII+A; Part X-XIV, 1846: 173-269, 1850: 270-324).
- Yang, H.C. and S.C. Lee (1966) New records of *Otophidium asiro*. *Ann. Rep. Taiwan Mus.* **9**: 29-31.
- Yang, H.C. (1969) Fish fauna of the deep-sea trawl fishery ground at Tungkang. *Spec. Rep. TFRI* **15**: 123-138.

臺灣產魷鰂科與胎鬚鰂科魚類之研究

陳麗貞 邵廣昭

臺灣產之魷鰂科 (Ophidiidae) 魚類根據過去文獻記載共有 9 屬 15 種，其中包括應屬胎鬚鰂科 (Bythitidae) 魚類的 2 屬 2 種。但根據筆者等重新檢查近來及過去所採集或已鑑定的標本發現，其中有許多誤鑑或標本遺失的種類，目前已確定有標本且學名正確的魷鰂科魚類應僅有 5 屬 7 種，它們分別是多鬚魷鰂 *Brotula multibarbata*、棘魷鰂 *Hoplobrotula armata*、黑斑新魷鰂 *Neobythites nigromaculatus*、新魷鰂 *N. sivicola*、斑新魷鰂 *N. stigmus*、蓆鱗魷鰂 *Ophidion asiro* 及仙魷鰂 *Siremba imberbis*。過去曾記錄過的全魷鰂 *Homostolus acer* 和深海魷鰂 *Bassobythites brunswigi* 因標本遺失已無從查考；以及單絲魷鰂 *Monomitopus kumae*、白單絲魷鰂 *M. pallidus*、姬魷鰂 *Pycnocrasedum microlepis*、及紋身新魷鰂 *Neobythites fasciatus* 因誤鑑之故，在本文中皆未計入。

胎鬚鰂科 (Bythitidae) 則應獨立為一科，共有 2 屬 3 種，分別為褐深海鬚魷 *Brotulina fusca*、細眼雙鬚魷 *Dinemathichthys minyomma*、及粗吻雙鬚魷 *D. dasyrhynchus*。後 2 種過去曾被鑑定為小眼雙鬚魷 *D. ilucoeteoides* 的種類，現已重新訂正，故此兩種應屬本省之新記錄魚種。文中除附此二科魚類各種之描述、檢索表等資料外，並附各種之彩色標本照片。